British Museum (Natural History)
Dept. of Mineralogy
A guide to the mineral gallery

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BRITISH MUSEUM (NATURAL HISTORY)

CROMWELL ROAD, LONDON, S.W.

A GUIDE

TO THE

MINERAL GALLERY.

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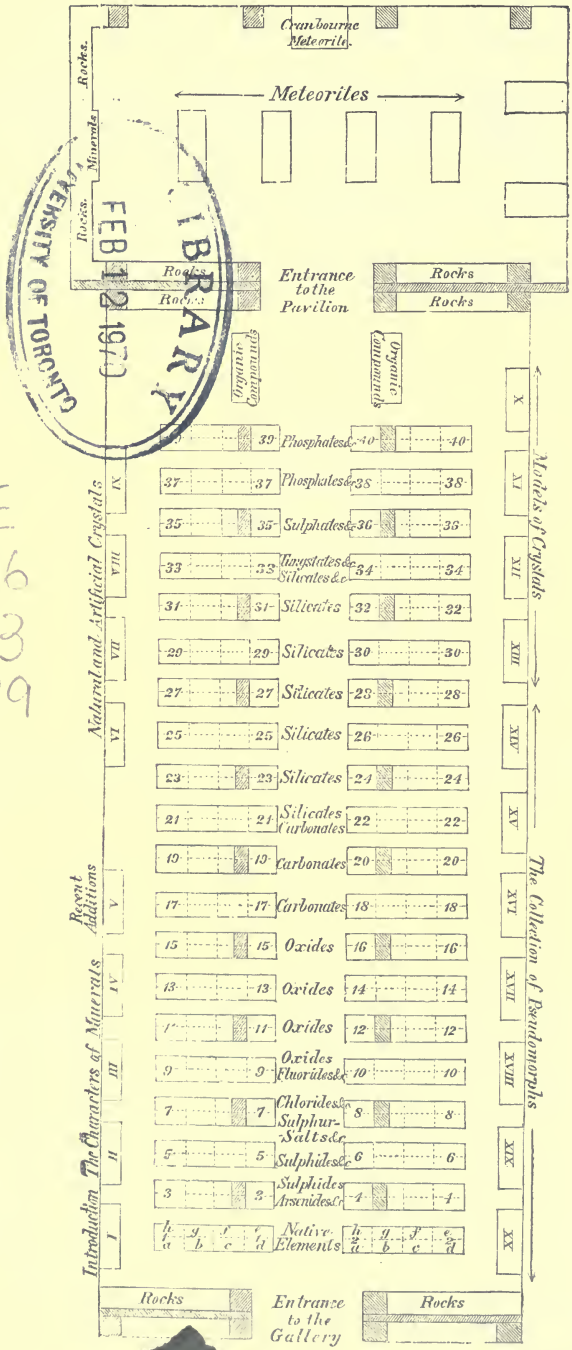
PLAN OF THE MINERAL GALLERY



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GENERAL ARRANGEMENT.

By ascending the large staircase opposite to the Grand Entrance of the Museum and turning to the right, the visitor will reach a corridor leading to the Department of Minerals.

In a wall-case of the corridor, to the left of the entrance to the Gallery, are shown polished specimens of some of the rocks and simple minerals used for decorative purposes.

Leaving the corridor, the visitor will find the mineral collections arranged in two rooms—the first of them, the Gallery, measuring 236 feet by 50 feet; the other, the Pavilion, 37 feet by 60 feet.

The AUXILIARY COLLECTIONS are arranged in twenty table-cases placed before the windows of the Gallery. Beginning with the first on the left, the contents of these cases are as follows:—

CASE I. A series of specimens and models illustrating the gradual development of the Science of Mineralogy.

CASES II.–IV. Specimens illustrating the Characters of Minerals, and the terms used in their description.

CASE V. Recent additions.

CASES VI.–IX. Crystals, natural and artificial.

CASES X.–XIII. Models of Crystals.

CASES XIV.–XX. Pseudomorphs.

The SPECIES AND VARIETIES OF MINERALS are arranged in the remaining table-cases of the Gallery, forty-two in number.

The ROCKS are shown in the wall-cases of the Gallery and Pavilion, but are not yet finally arranged.

The METEORITES are exhibited in the four central cases of the Pavilion.

ORDER OF STUDY.

It is recommended that the Collections be studied in the following order:

I. The Introduction to the Study of Minerals, in the first window-case on the left-hand side of the Gallery (page 5).

II. The Characters of Minerals, illustrated in the three succeeding window-cases (page 5).

III. The Mineral Species and their Varieties, in the forty-two table-cases of the Gallery (page 6).

IV. The Meteorites, in the Pavilion at the end of the Gallery (page 31).

V. The Rocks (page 31).

I.—INTRODUCTION TO THE STUDY OF MINERALS.

In the first window-case on the left-hand side of the Gallery is a series of specimens selected and labelled to serve as an introduction to the study of Minerals. Beginning with a definition of what is meant by a mineral, it is there shown how essential characters were gradually recognised, and how minerals have been distributed into kinds and classified. This introduction is published in book-form.*

II.—THE CHARACTERS OF MINERALS.

In the next three window-cases specimens are arranged to illustrate the characters of Minerals and the various terms which have been found useful in their description.

The remaining window-cases in the Gallery contain the Recent Additions, the Collections of Crystals, Models of Crystals, and Pseudomorphs, and are arranged for the special student rather than the general visitor.

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* *An Introduction to the Study of Minerals, with a Guide to the Mineral Gallery. Price 6d.*

III.—THE MINERAL SPECIES AND THEIR VARIETIES.

The collection of Mineral Species and their Varieties is exhibited in the table-cases numbered 1 to 42: the eight panes of each case are severally distinguished by the letters "a" to "h."

The specimens are arranged as if each pair of cases formed a single large case extending across the Gallery.

For the use of the student there is published with the Introduction to the Study of Minerals, already referred to, a more detailed explanation of the collection and its classification: and also an Index* giving the names of all the species and varieties represented in the Collection.

DIVISION I.

THE NATIVE ELEMENTS.

Case 1ab. COPPER. This native metal, with silver and gold, has been known from the earliest times. The first locality known to the ancients is said to have been the Island of Cyprus, and to the name of that island the word copper is itself related. The toughness of the metal, and the hardness of its alloys made it highly valued by the ancients as a material for tools and weapons.

During the present century the finest crystals and the largest masses have been furnished by the mines of Russia and of the neighbourhood of Lake Superior: in one of the mines of the latter locality there was found, in 1859, a mass estimated to weigh upwards of 400 tons; its length was 45 feet, and its greatest width and thickness 22 feet and 8 feet, respectively; 40 men were employed for 12 months in extracting it.

* *The Student's Index to the Collection of Minerals. Price 2d.*

Though the crystals of native copper are rarely symmetrical in appearance, attention may be directed to the groups and tree-like growths of crystals from the Russian mines (case 1a), and to a branch of cubes from the Lake Superior mining region (case 1b). As instances of the variety of form of the native metal we may also mention:—the large irregular water-worn mass brought from a copper-mine near the Copper-mine River by Mr. Hearne and presented to the Trustees in 1818; the thin plate from Barr Head, Renfrew; the dendritic and the mossy growths from Cornwall; and the long branches from the Lake Superior district, of which the largest (presented by Professor Ruskin) is to be seen in the lower part of the case. Case 1a. Case 1b.

Silver is found native in a large variety of forms and in many localities. Cases 1c–2a.

Magnificent specimens have been obtained from the mines of Kongsberg in Norway: one of them, now in the Royal Collection at Copenhagen, weighs upwards of 5 cwt.

Amongst the specimens here shown we may remark:—dendritic growths from Potosi, Freiberg and Peru; bundles of coarse fibres from Chañarcillo; groups of fine curved fibres from Wheal Vincent, Cornwall; and native foil from Sultepec mine, Mexico; all in case 1c: a nugget, weighing thirty-seven ounces, from Peru; a mass of crystals and a long branch from Kongsberg; all in case 2a. Case 1c.

Native silver is seen intermingled with native copper in the specimens from Lake Superior: when fused together and allowed to cool under ordinary circumstances, an alloy of the two metals is formed. Case 1c.

Gold, one of the most widely occurring of minerals, is almost always found either in and about veins of quartz-rock or in alluvial deposits. Case 2b–

The native gold from our own islands, in case 2b, and the various nuggets from Australia and California brought together in case 2d, are well worthy of attention; the Latrobe nugget is especially remarkable as showing crystalline structure. A fine suite of specimens, collected in Brazil by Captain Lyon, R.N., is exhibited. Case 2d.

Specimens illustrating the varieties of crystalline form will be found in case 2c. Other forms of occurrence are the leaf-

gold and the dendritic growths, of which many specimens are shown in case 2c and 2e.

A large mass of quartz from Costa Rica, estimated to contain above 50 oz. of finely divided gold, will be seen in the lower part of case 2.

The rare association of visible gold with galena is illustrated by specimens from Beresovsk and the Argentine Confederation (case 2b); while specimens from Ädelfors (case 2b) and the Solferino reef (case 2d), show the exceptional occurrence of gold in carbonate of lime.

Case 2e. Native gold always contains more or less silver, and when the proportion reaches about 20 per cent. is called *Electrum;* the crystalline forms of electrum are generally much more sharply defined than are those of the purer gold. Beautiful specimens of the pale gold from Transylvania are shown in case 2e; the percentage of silver in some of the specimens from that country reaches 38 per cent.

A variety of gold called *Porpezite* is rich in palladium; a small specimen is shown in case 2c.

Models of some of the most interesting gold nuggets are shown in the lower part of the case.

Case 2ef. Iron, Lead and Tin are of very restricted occurrence in the native state; almost all the iron thus met with is believed to have fallen from the sky, and many specimens of it are shown in the Collection of Meteorites in the Pavilion: the iron found at Ovifak by Professor Nordenskiöld is, however, now regarded by most mineralogists as having had a terrestrial origin. The iron of commerce is obtained from its "ores," among which we may especially mention magnetite, hæmatite, limonite, chalybite and clay iron-stone; the lead of commerce is in great part extracted from galena, a compound of lead with sulphur; and the tin of commerce from cassiterite or tin-stone, a compound of tin with oxygen.

Case 2f. Platinum is another valuable native metal, generally found in small grains but occasionally in rather large nuggets: one in the case weighs upwards of forty ounces. The metal was first met with in South America. After its discovery in the Urals an attempt was made to introduce a platinum coinage in Russia, but without success, owing to the irregularity in the

amount produced, though platinum to the value of £400,000 is said to have been coined between 1826 and 1844. Platinum is one of the heaviest metals known: it weighs in the native state 17 or 18 times, and when purified, 21½ times as much as an equal volume of water. It is almost infusible, and is attacked by few substances, properties which render it of great value as a material for chemical apparatus.

IRIDOSMINE is a rare mineral containing the metals iridium and osmium, and is generally found associated with platinum. It is used for the tips of the nibs of gold pens on account of its hardness and the difficulty with which it is acted upon by acids. Case 2f.

MERCURY, or Quicksilver, though found native, chiefly as small globules, is generally extracted from the mineral cinnabar, in which it exists in combination with sulphur. Though metallic in its general characters it is remarkable as being liquid at ordinary temperatures; it is by far the densest liquid known, being 13½ times as heavy as its own volume of water. It is much used for thermometers and barometers, the silvering of mirrors, the extraction of gold and silver from their ores, and the preparation of the artificial compound with sulphur, the *vermilion* of commerce. Case 2f.

NATIVE AMALGAM. The "mixtures" of mercury with other metals are called amalgams. That known as native amalgam is found almost wholly in the Landsberg mine in the canton of Ober-Moschel, Rhenish Bavaria; it contains from 25 to 35 per cent. of silver. Remarkably good crystals are shown in the case. Case 2f.

ARSENIC is rarely found in distinct crystals; it is often granular in structure and mammillary in shape: though initially tin-white it is soon altered to a dark grey by exposure. Simple metallic arsenic is not itself of much importance in the arts, but the alloy with lead has been found useful as a material for the manufacture of shot. The metallic arsenic required for commerce is for the most part obtained from mispickel, a compound of arsenic with sulphur and iron. Case 2g.

ANTIMONY, though found native, is chiefly obtained for commerce from the much more plentiful mineral stibnite, in which the metal is combined with sulphur. It is very valuable for the manufacture of type-metal, an alloy of anti- Case 2g.

mony with lead and tin; this alloy, like water, presents the exceptional property of increasing in volume when passing from the liquid to the solid state; it thus, whilst solidifying, keeps in constant contact with the mould and takes a sharp impression. Britannia metal and pewter are alloys of antimony with tin.

Case 2g. BISMUTH is chiefly found native: a very fine mass from Bolivia, rich in gold, is shown in the lower part of the case: specimens also are shown from Cornwall and Saxony. This metal has the peculiar property of forming alloys with lead and tin which melt at a very low temperature, some of them far below the boiling point of water: these alloys are much used in the process of stereotyping. The metal is also employed in the manufacture of some kinds of solder.

Cases 2h, 1ef. SULPHUR. The specimens of this mineral are, from their colour, transparency, size, and sharpness of crystalline form, among the most magnificent of natural products: very fine groups of crystals from Sicily and Spain will be found in the upper and lower parts of the case. Sulphur generally occurs in the neighbourhood of volcanoes, active or extinct, and is often associated with gypsum. Most of the sulphur required for commerce is brought in the native state from Sicily: in France, Germany, and Sweden it is also artificially prepared by heating pyrites. It is employed in medicine (the common brimstone); and also in the manufacture of gunpowder and of oil of vitriol.

Case 1f–h. DIAMOND and GRAPHITE, though chemically only different states of the element carbon, are almost completely opposite in their general characters. The diamond is the hardest of all known minerals; graphite is one of the softest: diamond is found in more or less symmetrical transparent crystals, generally colourless or faintly yellow, but sometimes with blue, grey, or other tints; graphite, on the other hand, rarely, if ever, occurs in well defined crystals; it is opaque, black in colour, and has a metallic lustre quite different from that of the diamond: diamond, too, is a very bad conductor of electricity, graphite an excellent one.

The diamond, from its rarity and hardness, has long been regarded as the most precious of the decorative stones; its

superiority of lustre and brilliancy has been rendered even more conspicuous by the discovery, made not many centuries ago, that this, the hardest of stones, can be cut and polished by means of its own powder.

The diamond becomes strongly electric on being rubbed; when it is heated or exposed to a strong light it becomes luminous, and retains its luminosity for several hours.

The collection of mounted crystals is extremely remarkable as representing a great variety of crystalline form. A very symmetrical South African crystal, weighing 130 carats, presented by Professor Ruskin, is exhibited; the triangular markings on the octahedral faces, so characteristic of the diamond, are in this specimen extremely distinct. Case 1g.

Models of some of the most famous diamonds are shown in a table-case in the Pavilion.

Those specimens which are useless to the jeweller, owing to imperfect crystallisation (when the specimens are known as *Boart*) or to flaws, have considerable value for the lapidary, by whom they are reduced to powder and employed in cutting and polishing the precious stones. Case 1f.

There is found in Brazil a black uncrystallised variety of carbon, called *Carbonado*, which has the hardness of the diamond, and is in much request for the drilling of hard rocks: to this purpose the diamond itself is not suited, for, notwithstanding its great hardness, it easily splits in certain directions related as usual to the crystalline form; of this property the diamond-splitter avails himself for removing the parts containing flaws, and for shaping the specimens before the polishing is begun. Very few diamonds are now found in India, where the once famous mines of Golconda are situated: almost all those of commerce are brought from Brazil and South Africa. Case 1f.

It is not known how the diamond has been produced in Nature, and it is even doubtful whether it has ever been found in the place where it was originally formed; specimens of the pebbles amongst which the diamond has been met with in Brazil and India and of the rocks in which it occurs in South Africa, are shown in the case.

Graphite, also known as *Plumbago* or *Blacklead*, has many Case 1h.

uses. In its purest form it is the material of blacklead pencils: excellent graphite for this purpose was long supplied by the mines of Borrowdale in Cumberland, now worked out. The less pure forms are employed for the polishing of stoves and for reducing the friction of machinery; large quantities from Ceylon are mixed with clay and made into crucibles at the Battersea works.

The specimens from New Cumnock show a columnar structure, probably caused by the heat from a neighbouring dyke. A curious fibrous structure is also conspicuous in some of the specimens from Battugol.

DIVISION II.

THE COMPOUNDS OF METALS WITH ELEMENTS OF THE ARSENIC AND SULPHUR GROUPS.

Case 3a. NICCOLITE is a compound of nickel and arsenic, and an important source of the nickel of commerce; an alloy of this metal with copper and zinc is the well-known German silver. The metal is at present chiefly used for electroplating with silver.

Case 3b. SMALTITE, a compound of cobalt and arsenic, is the mineral from which blue enamel colours, particularly smalt, are prepared.

Cases 3d, 4a. ARGENTITE is an important ore of silver, 100 parts containing 87 of that metal combined with 13 of sulphur; before exposure to the light it has a bright metallic lustre, but soon after exposure becomes coated with a dull dark powder: the mineral is remarkable as being perfectly sectile. Good specimens from Freiberg, Chili, and also Cornwall, will be found in the cases.

Case 4b-d. BLENDE is an important ore of zinc: 100 parts of the mineral contain 67 of zinc and 33 of sulphur.

Case 4d. A particularly fine suite of specimens is shown in the case. Specimens of blende containing the rare element gallium, presented by the late Mr. W. G. Lettsom, are exhibited.

GALENA is by far the most important ore of lead: 100 parts of the mineral contain 87 of lead and 13 of sulphur. The crystals from Rossie and from Neudorf are very sharply defined. A large crystallised specimen from the Great Laxey mine is shown in a corner of the Pavilion. Case 4e–h.

COPPER-GLANCE, or Redruthite, is an important ore of copper: 100 parts contain 80 of copper and 20 of sulphur. The suite of specimens from Cornwall is unique for excellence and variety of crystalline form. The mineral is altered by exposure to light. Case 3e–g.

CINNABAR is the ore from which mercury (or quicksilver) is obtained by heating: 100 parts contain 87 of mercury and 13 of sulphur; the same compound artificially prepared is the *vermilion* of commerce. Almost the only localities known are those of Almaden in Spain, Idria in Austria, Moschel in Rhenish Bavaria, and New Almaden in California. Cases 3h, 5a.

MILLERITE is another source of the metal nickel: the wool-like form from St. Louis is worthy of notice. Considerable quantities of this mineral have been obtained from the Gap mine, Lancaster County, Pennsylvania. Case 5b.

PYRITES, or Iron-pyrites, contains 47 of iron and 53 of sulphur in 100 parts. Though one of the most common of minerals, the difficulty of getting rid entirely of the sulphur prevents it from being employed for the manufacture of iron: it is, however, extensively used in the preparation of the green vitriol and oil of vitriol of commerce. Case 5d, 6ab.

MARCASITE, having the same chemical composition and the same commercial uses as the last-named mineral, has from its lighter colour been called "White iron pyrites;" but the differences in the crystalline form and other characters make it necessary to regard the two kinds as different species. The crystals of marcasite are far from being so distinctly formed as those of pyrites. They generally group themselves into peculiar shapes, thus giving rise to the fanciful terms, Spear pyrites, Cockscomb pyrites, &c. Case 6b.

STIBNITE, or Antimonite, a compound of sulphur and antimony, is much used for the preparation of the metal and its salts, of which a large number have been employed in medicine: in the East the powdered mineral is used for painting the Case 6c.

eyebrows. The specimens from Felsöbanya and Japan are especially worthy of notice: a magnificent specimen from the latter locality is shown in the Pavilion.

Case 6g. ORPIMENT is the corresponding compound of sulphur and arsenic: the artificial compound was one of the ingredients of the pigment *king's yellow*, now superseded by the harmless *chrome-yellow*.

Case 6g. COBALTITE, or Cobalt-glance, like smaltite, is highly valued as an ore of cobalt: and is a compound of that metal with arsenic and sulphur. Its crystals are similar to those of pyrites in the development of their faces.

Case 6h. MISPICKEL, a compound of arsenic, sulphur and iron, is the chief source of the arsenical compounds of commerce.

Case 5e. ERUBESCITE is a valuable ore of copper, and contains that metal in combination with sulphur and iron: the copper varies from 60 to 70 per cent.

Case 5f–h. COPPER-PYRITES, or Chalcopyrite, is the most important of copper ores, and contains the same elements as erubescite but in different proportions, the copper amounting to only 35 per cent. It is also used for the preparation of the "blue copper" (copper sulphate) of commerce. For general excellence the series of specimens in the case is unequalled.

Case 7ab. TETRAHEDRITE, or Grey copper ore, is a most valuable ore of copper: it is a sulph-antimonite of that metal, of which part is frequently replaced by silver, iron and zinc. Some specimens from Cornwall are coated with copper-pyrites and are wonderfully tarnished.

Case 7d. BOURNONITE is a sulph-antimonite of lead: the specimens from Herodsfoot mine are unique for size and splendent lustre.

Case 8a–c. PYRARGYRITE is a sulph-antimonite, and PROUSTITE a sulph-arsenite of silver, and are both valuable ores of that metal: before they are blackened by exposure to light they have a beautiful blood-red colour. The pyrargyrites from Mexico and the Harz are particularly fine, while the mass of resplendent crystals of proustite from Chili, presented by the late Mr. Ludlam, is unique: unfortunately, for the above mentioned reason, it requires to be protected from the light.

DIVISION III.

THE COMPOUNDS OF METALS WITH ELEMENTS OF THE CHLORINE GROUP.

SALT, or Common salt, is a compound of the metal sodium with chlorine. It occurs chiefly in beds, often of great thickness and extent, and is present in solution in salt-lakes and brine-springs. The Great Salt Lake of Utah, which has an area of 2000 square miles, contains 20 per cent. by weight of common salt in solution. The Dead Sea contains 20–26 per cent. of solid matter, and one-third of this is common salt. The waters of the ocean contain 4 per cent. of solid matter in solution, and about three-fourths of this is common salt. The most famous mines are those of Wieliczka, in Austria, which have been worked for the last 600 years; the beds of salt are there so thick that they have been excavated into houses, chapels, and other ornamental forms, and the mines, when illuminated, are regarded as one of the sights of Europe. The salt mines of Cheshire are also well-known. Case 8f.

A beautiful crystallised specimen from Wieliczka, presented in 1862 by the Austrian Government, is in the case.

Some specimens are of a deep blue colour, which disappears when the salt is dissolved in water.

SAL-AMMONIAC is the corresponding compound of ammonium and chlorine, and is found as a sublimation-product near to volcanoes and ignited coal-seams. That required for commerce is artificially prepared: it is valuable in medicine, and is also used by tinmen in soldering. Case 8g.

CHLORARGYRITE, Cerargyrite or Hornsilver, contains 75 per cent. of silver and 25 per cent. of chlorine, and is a valuable ore of the metal. Chlorargyrite is remarkable for its malleability and sectility; it is blackened by exposure to light. Case 8h.

EMBOLITE contains 70 per cent. of silver, the remainder consisting of variable proportions of chlorine and bromine: it is the principal silver ore furnished by the mines of Chañarcillo, in Chili. Case 8h.

FLUOR is a compound of calcium with fluorine: an extensive suite of specimens in the cases illustrates the varieties of colour and crystalline form presented by this beautiful mineral. Cases 7e–h. 9ab.

Large quantities of the violet-blue variety (Blue John) have, until lately, been obtained from veins in the limestone of Derbyshire, and more especially from large caves in the Castleton district. The Derbyshire fluor is wrought into various ornamental articles: it takes a good polish, but on account of its easy cleavage is difficult to work. With the
ise 7g. exception of the pink variety found in Switzerland, all the finest specimens of this mineral are of English origin. Fluor is also employed as a flux in the reduction of various ores; and the hydrofluoric acid prepared from it is used for etching glass.

DIVISION IV.

THE COMPOUNDS OF OXYGEN.

(1). Oxides.

ise 10a-c. Cuprite, or Ruby copper, is an important ore of copper, of which metal it contains 89 per cent. It is found in beautiful transparent ruby-coloured crystals, which are rapidly blackened by exposure to light. Cuprite gives a very intense red colour to glass.

ise 10b. *Tile ore* is an earthy variety of the same mineral.

ise 10c. *Chalcotrichite* is a variety of cuprite in which the crystals are bright red and capillary, and are not so subject to alteration by light. Unequalled specimens both of cuprite and of chalcotrichite are in the collection.

ise 10ef. Spinel in its transparent varieties is one of the precious stones: the deep-red is the *Spinel Ruby* (less dense and less hard than the true Ruby), the rose-tinted is the *Balas Ruby*, and the yellow or orange-red is the *Rubicelle* of the jewellers: sometimes, too, it has a dark blue colour. On account of their hardness the less valuable specimens are used for the jewelling of watches. Specially worthy of notice are a large polished
ise 10e. octahedron, and a small growth in which the twinning is repeated in a peculiar way.

Spinel may also be regarded as an aluminate of magnesia: varieties, chiefly opaque, are produced by the replacement of

the magnesia and of the alumina by other oxides; among these varieties are *automolite, dysluite, kreittonite,* and *pleonaste.* Case 10f.

Magnetite, or Magnetic iron ore, is the richest and most valuable of the ores of iron, of which metal it contains 72 per cent. Magnetite is one of the most widely occurring of minerals: it is remarkable for its magnetic properties, and is found presenting polar characters: it is the natural *loadstone.* The crystals from Nordmark and the Binnenthal are very bright and sharply defined. Case 10fg. Case 10f.

Chromite is the corresponding oxide of chromium and iron: it is the chief source of the salts of chromium, which are extensively used as dyes and pigments. Case 10gh

Franklinite is another member of this group; it is first worked for zinc, and then the residue is treated as an iron ore. Case 10h.

Uraninite, or Pitchblende, consists almost entirely of oxygen and uranium. From this mineral are obtained the uranium compounds used in porcelain painting, and yielding yellow and black colours. Case 10h.

Chrysoberyl belongs to this series of oxides; it may also be regarded as an aluminate of beryllium. In its transparent varieties it is one of the precious stones: the beautiful greenish-yellow variety, almost equal in lustre and hardness to the sapphire, is the *Oriental Chrysolite* of the jewellers; another variety, with a peculiar play of light, is the true *Cat's-eye;* while a third, green by sunlight but red by candle- or lamp-light, is the stone known as *Alexandrite.* Very fine twin-growths and cut specimens of these varieties are shown in the case. Case 9e.

Corundum is the sesquioxide of aluminium, and crystallises in the Rhombohedral system. Case 9f–h

Ranking next in lustre and in hardness to the diamond, it is, after the diamond, the most precious of stones. When pure it is the colourless variety known to jewellers as the *Lux Sapphire:* but with very minute traces of colouring ingredient it assumes the richest hues; when red it is the true *Ruby;* when azure it is the *Sapphire;* while the yellow, green, and purple varieties are known respectively to jewellers as the *Oriental Topaz, Emerald,* and *Amethyst;* the prefix *Oriental,* though at first used to suggest that the stones are not the ordinary topaz, emerald and amethyst, but other minerals of a Case 9h.

similar colour coming from the far East (India, Ceylon, Siam, Pegu, &c.), was afterwards understood to imply only the *excellence* of their characters. The *Star-stones*, when placed in a strong light, show a six-rayed star; its position bears a simple relation to the crystalline form.

An extensive suite of facetted specimens of these varieties will be found in the case.

Case 9. *Emery* is an opaque and impure corundum, but is still, from its great hardness, very valuable as a polishing material.

Case 11a-c. HÆMATITE, though very different from corundum in its external characters, corresponds to it very closely both in chemical type and in the fundamental angles of the crystalline form; it is a sesquioxide of iron and a very important ore.

Of *Specular iron*, the crystallised variety of hæmatite, a fine suite of specimens, more especially from Elba and Switzerland, is shown in the case; some of them have a characteristic tarnish which produces an effect of great beauty.

Case 11a. The massive variety known as *Red Hæmatite* is found in large deposits both in Lancashire and Cumberland; a large mass of it will be seen in the corner of the Pavilion. *Red Ochre* is an earthy variety of this mineral. Red Ochre, and also massive hæmatite when reduced to powder are used as polishing materials.

Case 12d. TURGITE is a common ore of iron, containing, in addition to the elements of hæmatite, 5 per cent. of water.

Case 12e. LIMONITE is one of the most important ores of iron, and when pure yields iron of superior quality; it has the same components as turgite, but contains about 15 per cent. of water. Reduced to powder it is, like hæmatite, used as a polishing material.

Case 12f. LIMNITE is the most highly hydrated oxide of iron, and contains as much as 25 per cent. of water.

Case 12f. BEAUXITE, or Bauxite, a hydrated oxide of aluminium and iron, is used for the manufacture of metallic aluminium on a large scale.

Case 12fg. PSILOMELANE is a common ore of manganese, and generally contains from 70 to 80 per cent. of the oxides of that metal: the oxide of barium present sometimes reaches 17 per cent.

WAD is a very similar mineral, but contains more water. Case 12h.

The last five minerals are not found crystallised.

PYROLUSITE, beginning the series of dioxides, is the most important ore of manganese. It is much used in the manufacture of glass for getting rid of the brown and green tints; also for bleaching purposes, and for the preparation of oxygen. The sulphate and chloride of manganese made from it are used in calico printing. Large and fine dendritic growths of pyrolusite are met with in the limestone of Solenhofen, in Bavaria; a good specimen is placed in the lower part of case 14. Case 11e.

CASSITERITE, or Tin-stone, is the ore of tin, of which metal it contains 79 per cent. The mines of Cornwall supplied the ancients with much of their tin. An extensive suite of crystals from Cornwall, Schlaggenwald, and Ville d'Er will be found in the case. Cases 11f–13b.

Wood-tin is an uncrystallised fibrous form of the mineral, somewhat like dry wood in colour and structure. Case 13a.

Stream-tin is the ore in the form of sand, as obtained from the beds of streams or the adjoining gravel. Case 13ab

ZIRCON contains the dioxides of both zirconium and silicon: its crystals belong to the same system as those of cassiterite, and they have almost identical angles. Twin-growths are, however, as rare in zircon as they are common in cassiterite: the specimen from Renfrew in Canada is remarkably fine. When clear and without flaws it is one of the precious stones: one variety with peculiar red tints is the *Hyacinth* or *Jacynth*, while the colourless, yellowish, and dull green are termed *Jargoon*: the colourless variety, owing to its high refractive power, approaches even the diamond in brilliancy: zircon is the most dense of the precious stones. Fine cut specimens, and an almost unrivalled suite of Russian crystals, are shown in the case. Case 13bc Case 13c. Case 13b.

RUTILE, ANATASE, and BROOKITE are chemically identical, and are various forms of the dioxide of titanium. Cases 13c–14a.

Fine specimens of rutile from Graves Mountains and Brazil, of anatase from Switzerland, and of brookite from North Wales and the Zillerthal, will be found in the cases.

QUARTZ in its clear and transparent variety is the *Crystal* of Case 14l.

the ancients, and the *Rock-crystal* of modern times; it is the *Brazilian Pebble* of the spectacle-makers. Several of the
Case 14b. specimens from La Gardette are remarkable not only for their clearness, but also as fine examples of a rare kind of twin-growth. The simple rhombohedra from Bristol and Onega, and the rare specimens showing a basal plane, are worthy of
Case 14c. notice. A large ball, brought from Japan, illustrates this species in its purest form. The largest crystals are shown on separate stands in the Pavilion: one of them, a fine well-developed crystal, was presented in 1882 by Mr. C. S. Bement, of Philadelphia, U.S.A.

Case 14d. The history of the formation of rock-crystal is illustrated by some most interesting specimens enclosing other minerals.

Case 14e. Next follow the less clear varieties of quartz, beginning with the white. The *Potato-stone* from Clifton, near Bristol, in outer aspect is like its namesake, but when broken is found
Case 14f. to be hollow and lined with crystals. *Cotterite*, an Irish quartz, has a peculiar pearly lustre.

Case 14fg. To this succeed the smoky varieties, including the *Scotch*
Case 14gh. *Cairngorm* and *Occidental Topaz*. Next comes the *Amethyst* sometimes yellow, sometimes purple; as a precious stone the amethyst lacks in brilliancy, but still is beautiful in colour. The amethyst is distinguished from the other varieties of quartz by its rippled fracture and optical characters. Next
Case 13e. follow the *Milky quartz*, *Rose-coloured quartz*, and the *Prase* of a leek-green colour. *Avanturine quartz* is the name given to a variety spangled in general with mica. The *Quartz Cat's-eye* is a variety presenting the opalescence, but not the hardness
Case 13f. or the brilliancy of the true Cat's-eye (chrysoberyl); an effect due to fibres of an asbestos-like mineral in the specimens from Ceylon, and to fibres of crocidolite in the blue, and of altered crocidolite in the brownish-yellow specimens from South Africa.

These are followed by a series of specimens illustrating peculiarities of form: cellular, hacked, spongy, fibrous (both parallel and radiated), and capped.

Case 13g. The so-called *Eisenkiesel*, or iron-flint, encloses and is coloured by the yellow or red oxide of iron.

Case 13gh. Next comes *Jasper*, an uncrystallised coloured mixture of

silica and clay, distinguished from ordinary quartz by its opacity and dull "earthy" fracture. It is of various colours chiefly red, brown, yellow, and green; and the colours are arranged sometimes in a nodular form as in the Egyptian jasper, at other times in stripes, as in the Riband jasper. Case 13h.

The *Lydian-* or *Touch-stone*, by reason of its hardness and black colour, has been used from remote ages to test the purity of the precious metals. Case 15a.

Hornstone is a variety of silica without evident crystallisation, and generally presents a more or less splintery fracture; but in one kind, *Flint*, the fracture is conchoidal, sometimes conical, as is well shown by the specimens in the case; in *Wood-stone* the particles of woody matter have been so replaced by silica that the details of the original structure have been well preserved. Case 15a. Case 15b. Case 15a.

Chalcedony has a lustre nearly that of wax, and is either transparent or translucent: specimens from the Trevascus and Pednandrea mines, Cornwall, and from the Faroe Islands and Iceland, are worthy of special notice. The specimens from Uruguay enclose water. Case 15b. Case 15d.

The *Heliotrope* or *Bloodstone*, is a green stone with red blood-like spots. Case 16a.

Next follow the *Plasma* and *Chrysoprase*, green stones: and the *Sard*, generally a brownish-red; as also the *Sardonyx*, its banded variety: all of them much prized by the ancients because, though hard and tough enough to resist ordinary wear and tear, they are more suited to the display of the engraver's skill than are the harder and more precious stones.

Then come the *Agates*, chiefly formed of thin layers of porous chalcedony of different colours, though the material of many of the white layers is a compact semi-opal. Most of the specimens are now brought from Uruguay, in South America, and are cut and polished at Oberstein, where, in former times, agates were largely got from the mountains of the district. Sometimes the layers are plane and parallel, and the stone is then an *Onyx*, useful as a material for cameos: or the bands of a section are arranged in zig-zag lines, and the stone is then called a *Fortification-agate:* but in the ordinary agate the layers are variously curved: many examples of the variety of Case 16b. Case 16c.

curve and colour will be seen in the case. The *Brecciated*
Case 16c. *agate* from Kunnersdorf is especially worthy of notice.

Case 16e. The *Moss-agates*, or *Mocha-stones*, are varieties of chalcedony, enclosing moss-like forms of oxides of manganese and iron and green earthy chlorite.

Case 16e. The *Carnelian* is a beautiful stone much valued by the engraver: its fracture has a peculiar waxy lustre, and is distinct from that of the sard, which is dull and hornlike.

Cases 16f h, 15e. We now come to the varieties of OPAL, the first being *Hyalite*, its purest form, generally clear and transparent as glass.

Next follows the *Precious* or *Noble Opal*, conspicuous for its fascinating play of colours: by the side of those from the old
Case 16f. Hungarian locality will be seen splendid examples from Queensland, presented by Professor N. S. Maskelyne, M.P., F.R.S.

Hydrophane is remarkable as only being transparent and opalescent when its pores are filled with water.

Case 15g. The *Fire-opal*, from Mexico, varies from hyacinth-red to honey-yellow in colour.

Cases 15h, 15e. Next to these are arranged other varieties, the green *Prase-opal*, *Common Opal*, *Rose-opal*, *Wood-opal*, *Liver-opal*, *Semi-opal*, *Cacholong*, and also *Fiorite*, with its beautiful pearly lustre.

A series of specimens illustrating some of the forms of native silica, arranged and described by Professor Ruskin,* is shown in a table-case of the Pavilion.

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(2). OXYGEN-SALTS.

Case 18a. WITHERITE is the barium carbonate; it is much used in Carbonat the manufacture of plate glass, and, in France, in that of beet-sugar: the specimens from Fallowfield mine are remarkable twin-growths.

Case 18b. STRONTIANITE, the strontium carbonate, is the mineral from which most of the strontium nitrate is made for use in the manufacture of fireworks, owing to the fine crimson colour which it gives to the flame; it is at present much employed in the process of sugar refining.

* *Catalogue of a Series of Specimens illustrative of the more common forms of Native Silica. By John Ruskin, F.G.S.*, 1884. *Price* 1*s.*

CERUSSITE is the corresponding lead carbonate, and is identical in chemical composition with the manufactured "white-lead" of commerce: when abundant it is a valuable ore of the metal. The suite of crystallised specimens is a very fine one, but the specimens from Cardiganshire and Poullaouen, presented by Mr. J. Taylor and Mr. R. Simmons respectively, are worthy of special mention. Case 18b. Case 18c.

First of the Rhombohedral carbonates is CALCITE, carbonate of calcium. The clearest and purest variety is that from Iceland, thence termed *Iceland spar*. In this variety, owing to its clearness, was first remarked the fact that generally there are two images of an object seen through a cleavage-plate: whence it is sometimes called *Double-refracting spar*. It is largely used in optical instruments for affording polarised light. Cases 18e–20c.

The extraordinarily fine suite of specimens of calcite exhibited in the cases illustrates the almost endless variety of its crystalline form, and at the same time shows that the variation is controlled by a definite law of symmetry. The specimens from Derbyshire and Cornwall are particularly worthy of attention. Two very large crystals from Iceland are shown in the Pavilion.

Specimens of twin-growths are shown in cases 19d and 20a.

The so-called *Crystallised sandstone of Fontainebleau* is a curious variety of calcite enclosing a large quantity of grains of sand. Case 19d.

In case 20b, are shown stalactites and stalagmites, formed respectively on the roofs and on the floors or sides of caverns: they owe their origin to the slow dropping and evaporation of water, which has become charged with carbonic acid, and afterwards with carbonate of lime, in its course through limestone rocks.

These are followed by a group of specimens illustrating the varieties of colour presented by this mineral. Case 20bc

Carbonate of lime occurs on a large scale as limestone and marble, varieties which will be found among the Rocks.

MAGNESITE is the corresponding carbonate of magnesium. Case 20d.

DOLOMITE is a carbonate of magnesium and calcium. The rock is used as an ornamental marble; when burnt it yields Case 20d.

a durable cement. Both dolomite and magnesite were formerly largely used for the preparation of artificial Epsom salts.

Cases 20h, 19e–g. CHALYBITE, or Spathic iron ore, is the carbonate of iron, and is a most valuable ore of the metal. The series of crystallised specimens from Cornwall is very fine. Mixed with clay it is the most important English iron ore, *Clay-iron-stone.*

Cases 19h, 21a. CALAMINE, the carbonate of zinc, is an important ore. The crystallised specimen presented by Mr. R. Simmons, in 1836, is unique for excellence (case 19h).

Cases 21d, 22a–d. CHESSYLITE and MALACHITE are respectively the blue and green hydrated carbonates of copper, and are ores of that metal. An excellent suite of specimens of chessylite will be found in the case. Malachite is found in large masses; and by reason of the high polish which it takes and its beautiful markings, is much used for ornamental work of various kinds.

Silicates.

Case 22f. OLIVINE in its clear transparent forms is one of the less hard and least valued of the precious stones; when of a yellow colour it is known as the *Chrysolite,* while the pistachio-green variety is the *Peridot* of jewellery. Fine crystals and facetted specimens are shown.

Cases 22h–24d. The ENSTATITE (Case 22h), AUGITE (Case 21e–h), and HORNBLENDE groups (Cases 23a–24d) are most important minerals as constituting a large portion of the earth's crust. *Bronzite* (Case 22h), *Diopside* (Case 21e), and *Hiddenite* (Case 23a), are used in jewellery.

Case 24c. ASBESTOS is the only variety of hornblende used in the arts; it is found as long fibres, and in some of its varieties is so flexible that it can be woven into gloves and other articles; examples will be found among the worked specimens in the Pavilion. The term asbestos, *unquenched* or *unquenchable,* was applied to the mineral by the ancient Greeks because, owing to its being unaltered by heat, wicks made of it were used in maintaining the sacred perpetual fires of their temples. Napkins of asbestos were cleaned by being thrown into the fire; asbestos cloth was also used in the process of cremation to keep the ashes of the body distinct from those of the fuel.

It is now much employed for lining iron-safes, as a packing for steam-pipes and boilers, and in gas-stoves.

JADE, or Nephrite, is a mineral assigned to the hornblende group, and is essentially a silicate of magnesium and calcium. This mineral has few known localities, and it has been difficult to answer the question as to whence the older workers of jade can have obtained their material. Case 24d.

The various shades of colour, and the beautiful polish which this tough mineral will take, are illustrated by specimens in the case. The worked specimens from New Zealand, of which there are several in the collection, are now rare.

An immense waterworn mass found some years ago near the graphite mines of M. Alibert, to the west of Lake Baikal, in Asiatic Russia, is shown in the Pavilion.

One of the characters useful for the recognition of jade is its specific gravity: this is generally about 3·0 in the green, and about 2·9 in the cream-coloured varieties.

APOPHYLLITE is a hydrated silicate of calcium and potassium. Extraordinarily fine specimens, got in blasting the rocks during the construction of the Bombay and Poonah railway, were presented by Mr. J. J. Berkley, in 1860; the larger ones are shown in a wall-case of the Pavilion. Cases 24f–23e.

MEERSCHAUM is the light soft porous mineral used for tobacco-pipes: it is a hydrated silicate of magnesium. Case 23g.

SERPENTINE is another hydrated magnesium silicate: the ease with which it is worked and takes a good polish, its green colour and varied markings, render it much sought for as a material for fire-places, tables, and other indoor work: exposed to the weather it soon loses its polish. Occurring on a large scale, it is best considered among the Rocks; only specimens illustrating the simple mineral are shown in the case. Case 25a.

TOPAZ in its clear varieties is one of the precious stones. A large series of specimens illustrating the varieties of crystalline form will be found in the case; those from the Urulga river in Siberia are remarkably fine examples of crystalline development; some are of a delicate brown colour, but are kept covered up as the action of light speedily bleaches them. The yellow crystals from Brazil assume a peculiar pink colour when heated, and are then known to jewellers as *Burnt* or *Pink topaz;* Cases 25c–26b. Case 25d.

some of these will be found in case 26a; crystals with the same tint are sometimes found in Nature. The crystals from Saxony
Case 25c. are of a paler yellow colour, which they entirely lose on being heated. Topaz has a very easy cleavage, and readily becomes electric on being rubbed or heated.

Case 26e-h GARNET belongs to the group of precious stones; when the red is tinged with violet, it is the *Almandine* and the *Syrian garnet* (after Syriam in Pegu), and when cut *en cabochon*, the *Carbuncle* of jewellery (Case 26f); the *Cinnamon stone* or *Essonite* is yellow (Case 26e); the *Pyrope* and the *Bohemian garnet* are blood-red (Case 26e). *Uvarovite* is a green chrome-garnet (Case 26h). In the case will also be found some of the green garnets from the gold washings of the river Bobrowska in Russia (Case 26g). Garnet often acts on a magnetic needle; it is one of the densest and most common of the precious stones.

Case 27a. JADEITE is essentially a silicate of sodium and aluminium. It is one of the green stones which, under the name of jade, are wrought into ornaments in China; from that mineral, however, it is distinguished by its chemical composition, structure and higher specific gravity, the latter ranging from 3·1 to 3·4.

Case 27cd. EPIDOTE is essentially a silicate of calcium, iron and aluminium. Fine specimens from the Untersulzbachthal are in the case.

Case 28a-e. MICA is the name given to a group of minerals differing much from each other in chemical composition and optical properties, but having as a common character an easy cleavage in a single direction, and thus affording plates remarkably thin, transparent, tough and elastic. One of these minerals,
Case 28d. muscovite, has been used in Russia in place of glass for windows; it is now in common use for lanterns and stoves, not being so easily cracked as glass by change of temperature: it is still known in commerce as *talc*, a term applied to it by the older mineralogists.

Cases 28f-29b. The FELSPARS are a family of mineral species of vast importance to the student in that they are among the most frequent of rock-constituents. The *Sunstone* (Case 27e) and the *Moonstone* (Case 27h) are opalescent forms of felspar used by the jeweller.

BERYL, a silicate of aluminium and beryllium, presents Hexagonal symmetry.

Emerald, its bright green variety, is one of the most valued of precious stones. It was in ancient times worked in Egypt, as is proved by the rough specimens found in the old workings by Sir Gardner Wilkinson and presented by him to the Museum. Emeralds are found in the Urals; but the locality for the finest stones has for a long time been that of Muso, about seventy miles from Santa Fé de Bogotá, in S. America; excellent specimens are shown in the case. Lately emeralds, though not of a very good colour, have been discovered in the United States; some of the best of those found are here shown. Case 29c.

The remaining varieties of this species are illustrated by a large suite of crystals, those from Mursinsk, in the Urals, being particularly fine. Facetted specimens of the colourless beryl, and also of the bluish-green beryl, known in jewellery as *Aquamarine*, are exhibited. Cases 29c-30a. Case 30a

Next we come to the Zeolites which for delicacy and beauty yield to no other group belonging to the Mineral Kingdom; of these we may direct special attention to NATROLITE (Case 30g), SCOLECITE (Case 29f), ANALCITE (Case 29g), CHABAZITE (Case 31b), HARMOTOME (Case 31d), STILBITE (Case 32a–c), and HEULANDITE (Case 32d). Cases 30e-32d. Case 33a

TOURMALINE is a mineral of which the crystals belong to the Rhombohedral system, and are remarkable as presenting a difference in the development of the faces at the two ends of the prism. This difference in the crystalline development of the two ends is accompanied by a difference in electrical behaviour; for when a crystal of tourmaline is being warmed or cooled, not only does it become electric and first attract and then repel light bodies in the same way as does amber, but one end of the crystal is opposite in electrical character to the other. Tourmaline of certain colours is much valued for its property of acting as a polariser on common light, a plate of the proper thickness absorbing one of the two rays produced by the double refraction. Tourmaline is very variable in colour and also in chemical composition.

Some of its varieties when free from flaws are classed with the precious stones. Among these is the pink variety called

Case 33a *Rubellite.* Two very fine specimens of rubellite from Ava are shown in the case; one of them, remarkable for its size and shape, was brought from that country by Colonel Symes to whom it had been presented by the King; the other, not so large but of a deeper colour, was presented in 1869 by Mr. C. S. J. L. Guthrie. On a table in the Pavilion will be found a specimen from Elba, showing a large group of pink crystals still attached to the rock.

Case 33a. The pink-and-green tourmalines from Paris, Maine, U.S.A., are among the more beautiful of the mineral products of the United States.

Case 34b. HAÜYNITE is a compound silicate and sulphate having for monoxide bases soda and lime, and for sesquioxide base alumina; the rich blue variety is the *Lapis Lazuli* of jewellery, and is brought from Persia, China, Siberia and Bokhara, generally in the massive state. A large crystal in the case is worthy of attention.

When powdered, lapis lazuli furnished the once costly pigment *ultramarine;* through the discovery of a method of producing an artificial and cheap form of the same material, the use of the mineral as a pigment has been quite superseded.

Case 34d-h. We now come to a series of minerals, not only themselves of rare occurrence, but having in several cases for constituents some of the rarest elements, namely, the titanates, tantalates, niobates, &c.; they are, however, of greater interest to the chemist than the general visitor. Titanates, &c.

Case 35e-f. WULFENITE is the molybdate of lead, and is represented by fine specimens from the United States and Carinthia. Molybdates and tungstates.

Case 35h. WOLFRAMITE is the tungstate of iron and manganese, and is the chief source of the tungstates of commerce.

Case 35a. CROCOITE is a chromate of lead, and has the same chemical composition as the artificial pigment *chrome-yellow.* Chromates and tungstates

Cases 35c-36f. CELESTITE, BARYTES or Heavy Spar, and ANGLESITE, are respectively the sulphates of strontium, barium and lead, and are represented by fine suites of specimens.

Case 36f-h. GYPSUM, or Selenite, is the hydrated sulphate of calcium. Its crystals belong to the Oblique system; by reason of the

easy cleavage parallel to the plane of symmetry it may be obtained in very thin plates, which are much used in polarising apparatus. Gypsum, when heated, gives up its water of crystallisation and falls to a powder, known as "Plaster of Paris;" when moistened the powder combines again with the water and forms a coherent solid. Fine specimens from Bex and Sicily are in the case, and a very large crystallised specimen from Reinhardsbrunn, in Gotha, a gift from H.R.H. the late Prince Consort, will be found in the Pavilion. *Gypseous alabaster* is a massive variety of gypsum; owing to its white- Case 36h
ness, fine texture and softness, it is largely used as a material for statuettes and other ornaments: the *Oriental alabaster* is a harder substance, stalagmitic calcite.

EPSOMITE is the hydrated sulphate of magnesium, and is Case 36h
known in commerce as Epsom salts: it is largely used in medicine and in dyeing. Epsom salts are now largely manufactured from Kieserite.

KIESERITE is also a hydrated sulphate of magnesium, and Case 36h
occurs in beds at Stassfurt; it is only slightly soluble in water.

MELANTERITE is a hydrated sulphate of iron. The iron Case 35e.
sulphate of commerce (green vitriol), largely used for dyeing and tanning, and for the manufacture of ink and Prussian blue, is chiefly manufactured from pyrites and pyrrhotite.

CHALCANTHITE is a hydrated sulphate of copper. The Case 35f
"Blue Copper," or "Blue Vitriol" of commerce is chiefly manufactured from copper turnings and roasted copper ores; it is much used in dyeing and calico printing.

Borates. BORAX is a hydrated borate of sodium. It is much used as Case 37c
a flux; also in the process of soldering, and in the preparation of easily fusible enamels. It was formerly carried over the Himalayas from a lake in Thibet, but is now obtained largely from borax lakes of the United States, and is also extensively prepared from the boracic acid of the lagoons in Tuscany.

Nitrates. NITRE, or Saltpetre, the nitrate of potassium, belongs to the Case 37d
class of nitrates. It is used in the manufacture of gunpowder, and of nitric and sulphuric acids.

NITRATINE, or Soda nitre, is the nitrate of sodium: in the Case 37d.

Desert of Atacama it is found in beds of large extent. It is used for the preparation of nitric acid and of saltpetre, and also by farmers as a fertiliser.

Case 38g. CALAITE, or Turquoise, is a hydrated phosphate of aluminium; it owes its blue or green colour to the presence of small quantities of salts of copper and iron. It does not occur crystallised. Being as hard as felspar and taking a good polish, it has been much prized in jewellery under the name of *Oriental Turquoise;* that which comes into the market is chiefly brought from the turquoise mines, not far from Nishapur in Persia. Some specimens of the turquoise found by Major Macdonald in the neighbourhood of Mount Sinai are exhibited. Phosphates.

Case 40b-d. APATITE is a mineral in which phosphate of calcium is associated with chloride or fluoride of the same metal. Among the remarkably fine crystals exhibited may be specially mentioned those from Kiriabinsk, Knappenwand, Schwarzenstein and Bovey Tracey, the best specimens from the latter locality being in the lower part of the case. *Phosphorite, Sombrerite* and *Osteolite* are massive varieties of apatite. When abundant it is valuable as an agricultural manure; when used for this purpose it is first treated with sulphuric acid.

Case 40c.

Case 40d.

SUPPLEMENT.

Organic Compounds.

As a supplement to the collection of simple minerals, there is arranged, in cases 41 and 42, a group of natural substances which either belong or are closely related to the Mineral Kingdom, although in their formation organised matter has played a very important part. Consisting as these substances do, either wholly or in part of carbon and hydrogen, they form a group sometimes known as that of the Hydro-carbons.

The most important members are coal and amber.

Case 41ab. COAL, in most of its varieties, gives structural evidence of its vegetable origin: its chemical composition depends on the more or less complete nature of the change which has taken place, and is thus not so definite as in the minerals of the

preceding divisions. In the variety called *anthracite* all traces of the original organised structure have disappeared.

AMBER, in ancient times regarded as one of the precious stones, is likewise of vegetable origin. It is a fossilised resin, chiefly derived from trees allied to the existing pine: its originally viscous condition is sufficiently proved by the insects which are sometimes found enclosed in it. Some of the ambers from Sicily, when placed in the sun-light, present in a remarkable degree the peculiar optical character termed fluorescence. Case 42cd.

IV.—METEORITES.

The fall of masses of stone and iron from the sky, though observed again and again since the most remote ages, was very rarely credited by any one beside the spectators themselves; and till the beginning of this century no attempt to collect such specimens for examination and comparison was made. In the special guide* it is shown how evidence of the actual fall of such bodies at length became irresistible, and a description is given of the striking circumstances attending their fall, of their general characters, and of their chemical composition: illustrative specimens, collected together for easy reference, will be found in one of the cases. It is also shown that meteorites are closely related, not only to the ordinary shooting stars, but also to comets, and probably to the nebulæ and fixed stars.

V.—ROCKS.

A large collection of rocks, of great value to those engaged in petrological research, is preserved in the department. The chief part of the collection is kept in drawers, as unsuited to public exhibition, but a few specimens are shown in the wall-cases of the Pavilion and Gallery. In two table-cases of the Pavilion there is arranged a selection of typical rocks which will be of service to both the student and general visitor.

* *An Introduction to the Study of Meteorites, with a List of the Meteorites represented in the Collection. Price 3d.*

ALPHABETICAL INDEX TO THE MINERALS MENTIONED IN THE GUIDE.

L. FLETCHER.

December 1st, 1889.

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W. H. FLOWER,

Director.

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A guide to the mineral gallery

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